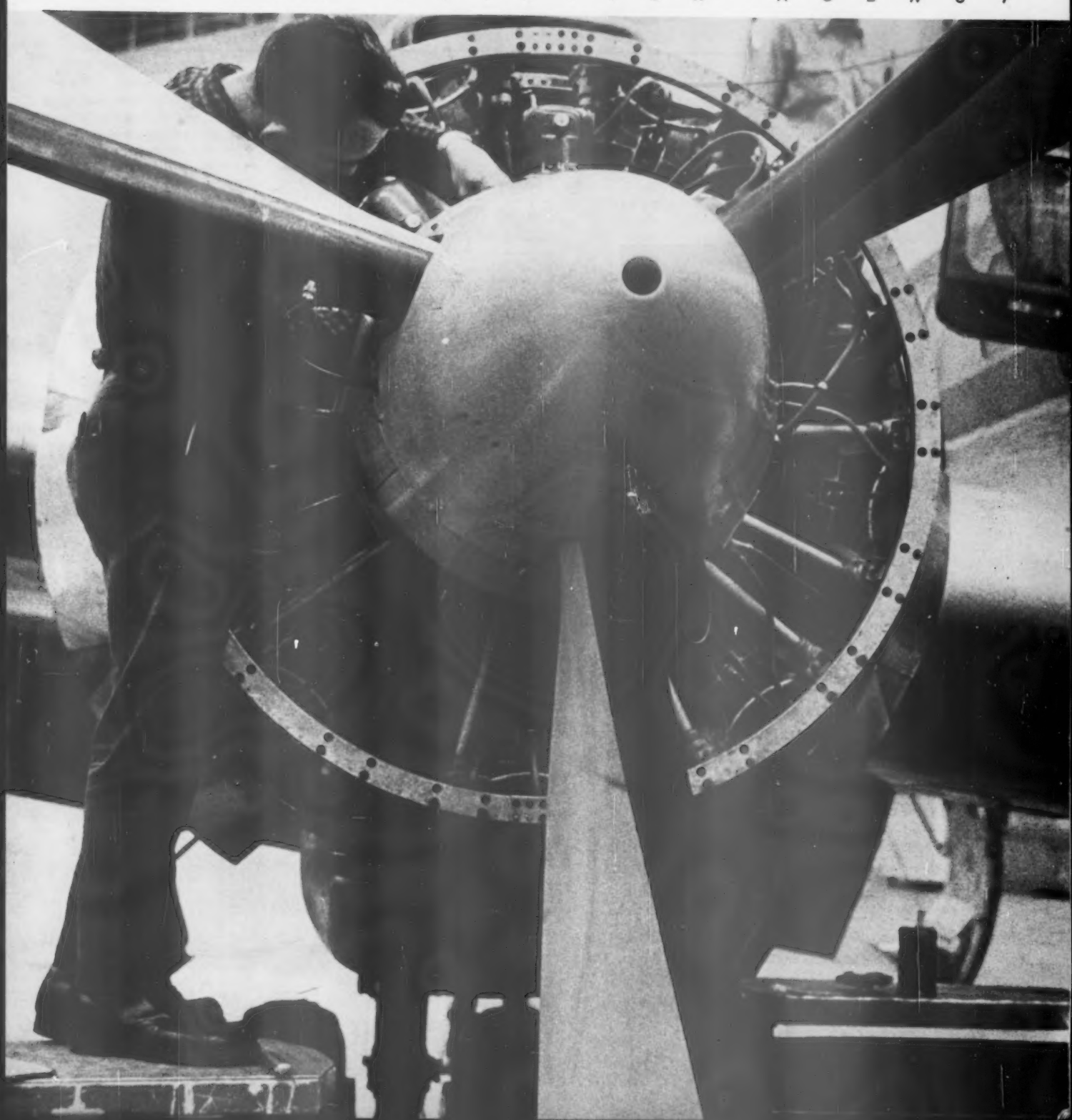
FAA | AVIATION NEWS

JANUARY 1964

F E D E R A L A V I A T I O N A G E N C Y



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VOL. 2, NO. 9 JANUARY 1964

COVER

FAA aircraft used for proficiency training as well as flight inspection of navaids get meticulous care at Agency's Aeronautical Center *(see page 8).*

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CONTENTS

3 FAA WILL STANDARDIZE, FINANCE TWO NEW TYPES OF CONTROL TOWERS

4 INSPECTORS CHECK CABINS FOR CARBON MONOXIDE

4 SURVEY OF COCKPIT RADIO NAVAIDS SEEKS TO ASSESS THEIR ACCURACY

4 EL AL, NORTHWEST ORDER SST, BRINGING ORDERS TO 45

4 REPLACING MEDICAL CERTIFICATE

5 ALERT CONTROLLER SAVES AIR FORCE JET PILOT

5 MILESTONES IN AVIATION

6 AIRFRAME MANUFACTURERS ASKED TO DESIGN NEW SHORT-HAUL TRANSPORT

6 FAA PROPOSES RULE ON COCKPIT VOICE RECORDERS

6 SEEK TO DEVELOP INDUSTRIAL PARK ADJACENT TO DULLES INTERNATIONAL

7 PROCEDURE FOR DOING BUSINESS WITH FAA IS A STREAMLINED AFFAIR

8 FAA'S COMPREHENSIVE TRAINING PROGRAM COVERS THE AIRFRONT

11 DULLES INTERNATIONAL PLAYS HOST TO WORLD LEADERS

12 ICING

14 SAFETY FIRST: PREFLIGHT

15 LETTERS

FAA WILL STANDARDIZE, FINANCE TWO NEW TYPES OF CONTROL TOWERS

The new year brings a new look in air traffic control towers.

For the first time, the Federal Aviation Agency will build control towers financed entirely by the Federal Government and built to FAA specifications. All will have a distinctive FAA look tailored to air traffic control requirements. All will be built according to one of two standard FAA designs (*see photos*):

- Towers at VFR or non-radar airports will have all operating space in the supporting structure.
- Towers at radar airports, usually the larger airports, will not. Instead, operating space will be centered in a one-story expandable base structure supporting a concrete shaft containing only elevator, stairs and control cables and topped by the tower cab.

Most towers in the FAA's initial construction program will be built at the smaller VFR airports. These will be free-standing towers with control cabs placed atop pentagon-shaped, steel-frame, metal-paneled supporting structures. These structures house five floors of operating space from the base of the tower up to the tower cab floor. Stairs will provide access to the tower cab. Floor-to-ceiling windows will be located at each corner of the five-sided tower. Each of the five sides will measure 30 feet at base, narrowing to 23 at the top.

FAA also will construct a standard concrete-shaft design tower at larger airports generally providing both VFR and radar or IFR air traffic control service. These will be built generally at locations which require towers higher than 60 feet and where future expansion of air traffic control facilities is anticipated.

Major advantage in this tower is the provision for future lateral expansion at ground level. This feature will eliminate many of the tower relocations that have been necessary in the past because of an airport's inability to provide additional space within the tower itself to keep pace with increased airport activities. The base structure will contain the radar (IFR) room, communications and other equipment—both mechanical and electronic—training room, ready room, administrative offices for the tower chief and maintenance chief and staffs, workshops, and a standby generator to be used in case of power failure.

New type of VFR airport control tower.

Mockup of interior of airport control tower.

Control cabs for both types of towers will be factory fabricated, including operating consoles to provide standardized working areas and environment for airport traffic controllers. Floor space will vary from 300 to 400 square feet. The larger cabs will be used on towers 120 feet and higher. All new towers will be air conditioned to provide proper operating conditions for the sensitive electronic equipment as well as for personnel.

Prior to adopting a standard workspace design for the tower cabs, FAA conducted experimental tests at its National Aviation Facilities Experimental Center (NAFEC) at Atlantic City, N.J., to determine the best arrangements for various workload levels. In a 110-foot high tower mockup, several configurations were demonstrated under simulated operating conditions to Washington and regional Air Traffic Service representatives and to airport tower controllers from field facilities in six different regions.

Tower locations on an airport will provide controllers in the tower cab with a maximum unobstructed view of aircraft in the air and on operating areas on the ground. Cab visibility will allow for adequate depth perception so that individual aircraft in a group of aircraft can be readily identified.

Airports where the new towers will be built are those which qualify for the first time for FAA control tower service under existing FAA standards. Also eligible are the busier airports whose present tower facilities lack the space, height and other conditions to permit controllers to provide the safe, efficient service demanded by modern aircraft and modern airports.

FAA's two new tower concepts represent one of the most progressive steps taken in recent years in government architectural design. From a functional standpoint, the towers will offer an optimum environment for both personnel and equipment to support the Agency's prime aims of operational safety and efficiency.

Construction costs will be generally comparable with the most recent free-standing towers constructed by airport sponsors. Considerable savings will be realized as a result of a plan for centralized procurement of prefabricated tower cabs. These may be assembled on the ground and hoisted into position. This technique will assume uniformity of tower cabs regardless of location.

In prior years, towers have varied in appearance as well as functional efficiency. This was due to the method of tower financing.

Airport sponsors usually supplied the locations—often on top of a terminal building—and shared construction costs with the Federal Government under the Federal-Aid Airport Program. The towers were built according to sponsors' designs —approved by the FAA—and provided varied environments for FAA airport tower controllers. Often, when air traffic activity increased at major airports, there was no room for corresponding expanded control activities. The result was hardship conditions for the controllers or expensive tower relocations for the airport sponsors and the Government.

The Federal Airport Act, amended in 1962, eliminated "buildings" such as terminal buildings and control towers from eligibility under the Act.

Terminal buildings now are strictly local responsibilities. The Federal Government pays no share of their costs. Airport control towers are FAA responsibilities. Airport sponsors furnish the land for the towers and FAA bears the total cost of the facility.

New type of IFR airport control tower.

INSPECTORS CHECK CABINS FOR CARBON MONOXIDE

General aviation inspector shows pilot device that can detect presence of carbon monoxide in cabin.

General aviation inspectors in FAA's Central Region have launched an experimental program to include as part of their routine flight duties a check for carbon monoxide in general aviation aircraft.

By scheduling the tests while performing pilot certification flight tests, proficiency flights, training, etc., no additional manpower is needed and no inconvenience is caused to airmen.

Purpose of the tests is to discover the presence of high levels of carbon monoxide gas in light aircraft before it causes accidents or fatalities. Carbon monoxide, a colorless, odorless, tasteless gas, has been long suspected as the possible cause of some past light aircraft accidents. Although the testing program will be conducted on a continuing basis, the danger is greatest during winter months when cold weather requires the operation of the aircraft heating system (*FAA Aviation News*, October 1963).

Since most light aircraft heating systems utilize engine exhaust as a heat source, a malfunction in either the heating or exhaust system may allow poisonous gasses to enter the cockpit.

Just a small amount of carbon monoxide can affect a pilot's physical condition. A concentration of 0.02 per cent (only two parts in 10,000) may produce headache, mental dullness and impaired vision all within a few hours time. A concentration of 0.10 per cent carbon monoxide may produce unconsciousness in little over an hour and may prove fatal in four hours.

FAA inspectors use an instrument that can detect concentrations of the gas from 0.001 per cent to 0.10 per cent by volume. The standard acceptable to the FAA is a concentration of one part in 20,000 or 0.005 per cent or less. The instrument is operated by drawing suspected air through a glass tube which is filled with a sensitive material. Presence of carbon monoxide will change the color of the material in the tube which is then compared to a set of color standards on the instrument. Matching the colors and using the associated readings in percentage gives the amount of gas present by volume.

Owners whose aircraft are found to contain a dangerous level of carbon monoxide will be advised.

EL AL, Northwest Order SST, Bringing Orders to 45

Israel's El Al Airlines and Northwest Airlines last month joined the list of prospective customers for the U. S. supersonic transport by submitting advance royalty payments for delivery positions.

El Al, the third foreign carrier to order the SST, asked for two delivery positions, and was assigned the 10th and 14th SST off the line. Northwest, the fourth American carrier to seek delivery positions, submitted an advance royalty for four positions. It will get positions 18, 22, 29 and 56.

Of the first 70 supersonic transports to be produced, 45 have already been committed. To date, $4.5 million in advance royalties have been received at the rate of $100,000 for each airplane.

Survey of Cockpit Radio Navaids Seeks to Assess Their Accuracy

Tests are underway on selected general aviation, military and airline aircraft to determine how accurately airborne radio navigation equipment is performing in the Nation's air traffic control system.

Work on Project NECAP (Navigation Equipment Capability Analysis Project) is being done by Hoffman Electronics Corporation, Los Angeles, under FAA contract.

In the seven-month tests—to be completed by June—checks will be made on approximately 1500 VOR receivers, DME and TACAN interrogators in aircraft based at widely scattered locations throughout the country. These are the airborne elements of the FAA's ground based VORTAC or primary short range air navigation system which gives pilots distance and bearing information while in flight.

The data gathered by Hoffman will be used to assess the average navigational accuracy of flights in the air traffic control system and to determine if there is a need for system improvements.

Only equipment in operating condition from currently airworthy aircraft will be selected and removed from aircraft for the test. Preference will be given to equipment presently in production or just coming into production and use. Inaccurate equipment will be adjusted by Hoffman technicians prior to reinstallation, except in the case of airline aircraft which will be adjusted by airline personnel based on the findings. Reports on each test will be identified by equipment manufacturer, model and serial number; aircraft manufacturer and model; and hours of equipment operation since new and since overhaul. Test results will be furnished aircraft owners and operators, but their names and specific aircraft identity will not be used in the reports.

Equipment in general aviation aircraft will be tested, and adjusted if necessary, by Hoffman's mobile laboratory working through local fixed base operators.

REPLACING MEDICAL CERTIFICATE

Lost your medical certificate? You can get a duplicate by writing to the Chief, Aeromedical Certification Division, Federal Aviation Agency, P.O. Box 1082, Oklahoma City, Okla. 73101. Enclose a check for $2.00 payable to FAA. Do not write to the Aviation Medical Examiner who issued the original.

ALERT CONTROLLER SAVES AIR FORCE JET PILOT

The Air Force Deputy Director of Aerospace Safety, Col. Paul P. Douglas, Jr., is convinced that cool thinking and quick action on the part of an FAA traffic controller saved his life.

Col. Douglas has written FAA Administrator N. E. Halaby commending Harold G. Garman "whose mental alertness and prompt corrective instructions recently averted a fatal aircraft accident . . . I was the pilot of the aircraft in question."

On November 15, Col. Douglas, flying a T-33 single-engine jet IFR, departed Norton Air Force Base, Calif., on an instrument flight to Riggs Air Force Base, Texas. His takeoff was normal and he entered the clouds at approximately 400 feet above the ground.

Reaching 3,000 feet on a 120 degree heading—still in the clouds—Col. Douglas made a routine radio call to the March Air Force Base air traffic control facility. The FAA air traffic controller monitoring Douglas' flight on radar was Harold G. Garman. Almost immediately he told Col. Douglas to execute "an immediate right turn to 180 degrees." A quick check by Col. Douglas showed a compass malfunction; he was 50 degrees off course and heading straight into the mountains. Garman coolly followed his life-saving command with necessary instructions to bring Col. Douglas safely back on course. At the same time, Garman kept Col. Douglas' jet safely separated from all other aircraft flying on instruments in the same area.

MILESTONES IN AVIATION

The three years immediately following the Wright Brothers' historic flight at Kitty Hawk were pretty well dominated by this inventive pair. In England, France and Germany many experiments were conducted—mainly with gliders and kites—but powered flight continued to be an American monopoly.

The Wrights had conquered the air a mere four-and-a-half years after writing to the Smithsonian seeking books on flying. Now they turned from *Flyer* No. 1, which has soared over Kitty Hawk, to developing a more practical machine. During 1904 they designed and built *Flyer* No. 2 in Dayton, flying the craft extensively at the world's first airdrome for aviation, a 90-acre field east of Dayton called Huffman Prairie. Wilbur Wright made the first circular flight in this airplane as well as the first flight exceeding five minutes. But a major problem continued to stump them: The airplane had a tendency to stall and go out of control when making tight turns.

Then in 1905 the Wright Brothers designed *Flyer* No. 3 (*above*) which became the first all-round successful airplane. They learned how to control stalls by putting the plane's nose down, thus getting more speed to maintain controllability. More important, they disconnected the device that linked the vertical rudder control with the wing-warp (later aileron), thus permitting independent operation of these two controls.

N. E. Halaby Visits Three West European Capitals, Soviet Union

FAA Administrator N. E. Halaby visited Moscow, London, Paris and Berlin last month.

Responding to a long-standing invitation, Halaby met with Aeroflot officials in Moscow. While in Western Europe, the Administrator conferred with civil aviation officials in London and Paris, visited FAA offices there and surveyed U.S. air carrier operations in and out of Berlin.

The last visit of a Soviet aviation official to the U.S. was at the time of the dedication of Dulles International Airport more than a year ago when technical matters were discussed. Reciprocally, Halaby exchanged professional views on civil aviation developments with Aeroflot officials. He also discussed arrangements for study of technical problems of an air route between the United States and the Soviet Union, should a civil air transport agreement be signed in the future.

Accompanying Mr. Halaby on his trip were two FAA officials, Raymond B. Maloy, Assistant Administrator for International Aviation Affairs; and George C. Prill, Assistant Administrator, Europe, Africa and the Middle East Affairs.

False Testimony in FAA Hearing Results in Perjury Conviction

A Macon, Ga., man has pleaded guilty to perjury while testifying before an FAA hearing officer during a safety enforcement proceeding.

The man, who falsely testified that he had not ridden as a passenger with a student pilot, received an 18-month suspended sentence and was placed on probation for five years by the U. S. District Court in Macon. Civil Air Regulations prohibit student pilots from carrying passengers.

The perjury conviction stemmed from testimony given during an FAA enforcement action to revoke the student certificate of the pilot. The passenger falsely denied being a passenger and that he knew the pilot on the date of the incident. Evidence of the illegal flight came to light when the aircraft made a forced landing due to bad weather and pilot disorientation.

FAA has revoked the pilot's student certificate and he has been indicted by a Federal grand jury on charges that he, too, committed perjury while testifying in the FAA enforcement proceeding.

AIRFRAME MANUFACTURERS ASKED TO DESIGN NEW SHORT-HAUL TRANSPORT

A government-industry program to stimulate development of a new passenger-cargo aircraft for the short-haul market got under way last month with the issuance of a Request for Proposals (RFP) by FAA.

The RFP solicits proposals from U.S. airframe manufacturers for the design of a short-haul transport "embodying the highest practicable degree of safety, reliability and economy of operation."

The aircraft is intended to meet the needs of the U.S. local service airlines as well as the short-haul operations of other airlines in this country and abroad. This market presently is dominated by the DC-3, an aircraft more than 25 years old.

A draft of the RFP was circulated for industry consideration last October and drew more than 40 letters of comment. A number of airframe manufacturers indicated interest in the program.

The program timetable calls for submission of preliminary design plans based on the RFP by May 15. A maximum of three manufacturers then will be selected to produce detailed design specifications under Government contracts not exceeding $100,000 each. This work will be due within four month of the contract date.

Selection of the most promising design will be made by FAA with the technical support of other Government agencies after receiving the evaluation and advice of the local service airlines and other interested groups. It is expected that this design would meet requirements of several Government agencies and permit fixed-price orders of sufficient numbers of the aircraft to enable the manufacturer to place it in volume production.

Design objectives outlined in the RFP include the following:

- The aircraft shall carry 14 to 30 passengers.
- Crew shall consist of two pilots who must be able to perform the necessary safety functions normally handled by a cabin attendant.
- Range shall not be less than 600 miles with provision for optional added tankage.
- Aircraft shall be able to operate from airports with 3000-foot runways.

FAA PROPOSES RULE ON COCKPIT VOICE RECORDERS

Cockpit voice recorders—a new accident investigation aid—would be required on all large commercial aircraft by July 1, 1966, under a rule proposed by the Federal Aviation Agency.

George S. Moore, Director of FAA's Flight Standards Service, said the voice recorder would be a valuable tool in the investigation of aircraft accidents by providing firsthand information on flight crew conversation during emergency situations.

This information, in turn, would lead to improvements in safety by facilitating the development and establishment of appropriate corrective measures.

FAA currently requires flight data recorders on all turbine-powered aircraft (pure jets and propjets) in commercial service to record barometric altitude, indicated air speed, vertical acceleration, compass heading and elapsed time.

"Although this data has been extremely helpful in estimating an aircraft's flight path and maneuvers during an emergency," Moore said, "valuable additional information could be obtained from a recording of the crew's conversation during this time period."

The proposed rule would require airlines and commercial operators to install cockpit voice recorders on all turbine-powered aircraft by July 1, 1965; on all pressurized four-engine piston aircraft by January 1, 1966; and on all other large aircraft (those over 12,500 pounds) by July 1, 1966.

The equipment would be operated continuously in the aircraft from the time the crew began the preflight checklist prior to starting engines until completion of the postflight checklist. The tape (or other recording medium) would be reused continuously with only the last 30 minutes of operation retained. The erasure function would stop automatically in the event of an accident.

Conversation on the flight deck would be picked up by one or more microphones mounted in the cockpit except in aircraft where the noise level is extremely high as in the DC-3. Here the crew would be required to wear headset boom-mounted microphones.

The equipment would record all voice communications by crewmembers on the flight deck as well as over the interphone and loud speaker systems. Radio messages and navigation and landing aid signals also would be recorded.

To minimize garbling of information on the tape, separate channels would record communications received or transmitted at the pilot, co-pilot and third crewmember (if such is provided) stations. A fourth channel would record the input from the microphones mounted in the cockpit.

Standards for impact, fire and water immersion also are prescribed to insure that the record will be usable after an accident. The equipment must withstand an impact of 100 G forces, temperatures of 1100 degrees Centigrade and immersion in salt water for 48 hours.

Deadline for comment on the proposal (Notice No. 63-46) is February 28, 1964. All comments received before that date will be considered by the Agency before taking final action on the proposal.

Seek to Develop Industrial Park Adjacent to Dulles International

FAA is looking into developing the southern border of Dulles International Airport into a 2,000-3,000-acre industrial park. Development of such an area was anticipated in the original site plan for the airport.

According to the plans, the FAA would install roads, sewer, water, electric and gas facilities in the park and then lease parcels of land to private firms for the construction of office buildings, factories and warehouses. The rental fees will be about the same as fees charged privately-owned land around the airport.

FAA planners describe the Dulles site as nearly perfect for industry, especially those related to aviation. Industries locating at Dulles will have access to the airport's runways, and will be permitted to use these runways.

The proposed Dulles Industrial Park is supported by the communities surrounding the airport and by the Commonwealth of Virginia. Though the project is still in the planning stage, several firms have indicated an interest in locating in the Dulles industrial park.

Moving to a New Location?

Subscribers to *FAA Aviation News* are requested when sending in a change of address notice to include their new ZIP code and to mail this notice to the Superintendent of Documents, Washington, D.C. 20402. To facilitate making the changeover, please include a mailing label from any issue of this magazine.

PROCEDURE FOR DOING BUSINESS WITH FAA IS A STREAMLINED AFFAIR

Contractors seeking to do business with the Federal Aviation Agency will find a streamlined, convenient point of contact at the Agency's Procurement Information Office recently opened on the ground floor of the new headquarters building at 800 Independence Ave., S.W. in Washington.

During Fiscal Year 1963, FAA awarded more than $160 million worth of contracts for equipment and services. Nearly 41 per cent or $67,591,791 went to small business firms.

At the Procurement Information Office, contractors can quickly obtain a variety of procurement information: current Requests for Proposals and Invitations to Bid, information on past awards including bidders' prices, quantity, discounts and delivery terms. In this office, FAA's Small Business Assistance Officer is available for consultation and advice to small business. He works closely with the Small Business Administration (SBA) representative to insure that a fair proportion of FAA contracts are awarded to small business and labor surplus area contractors. On proposed major procurements, the SBA representative develops programs for small business sub-contracting participation.

Contractors, large and small, have an equal opportunity to compete for FAA contracts ranging from a few hundred dollars to millions. FAA contracts above $2500 generally are awarded under formal advertising procedures where the lowest responsible bidder meeting FAA specifications is awarded the contract.

On contracts where it is not practical, economical or, in some cases, not possible to use formal advertising procedures, FAA negotiates with contractors most likely or able to fill its needs. However, the contracting officer still must obtain maximum competition.

In multi-million dollar purchases, the FAA may invite contractors to a pre-bidders conference to seek industry thinking before preparing final equipment specifications. Contractors other than those invited to a pre-bidders conference may submit proposals if they have experience in developing, engineering and producing the equipment under consideration and also have personnel, facilities and financial resources necessary to do the job.

FAA procurement activities are conducted at various locations throughout the country depending upon the type of requirements. Some are made in Washington, D. C.; some at the Aeronautical Center at Oklahoma City, Okla.; still others are made at each of the FAA regions within the 50 states.

Procurement Information Office similar to this helps businessmen learn what FAA is interested in buying.

The Washington procurement office is primarily concerned with research and development and with the acquisition of major air navigation and air traffic control systems for worldwide installation. Research and development contracting runs the gamut from studies in both basic and applied research through contracting for new equipment for experimentation, evaluation and acceptance testing.

One Aeronautical Center function is to assure worldwide supply support of FAA activities. Determined there are the requirements for maintenance and repair spare parts for all FAA navigation aids, air traffic control facilities and various types of aircraft.

FAA regional offices procure a variety of operating supplies and also make purchases of maintenance and spare parts for emergency repairs of the FAA facilities located within their geographical areas. Most regional procurement is in the field of construction contracting.

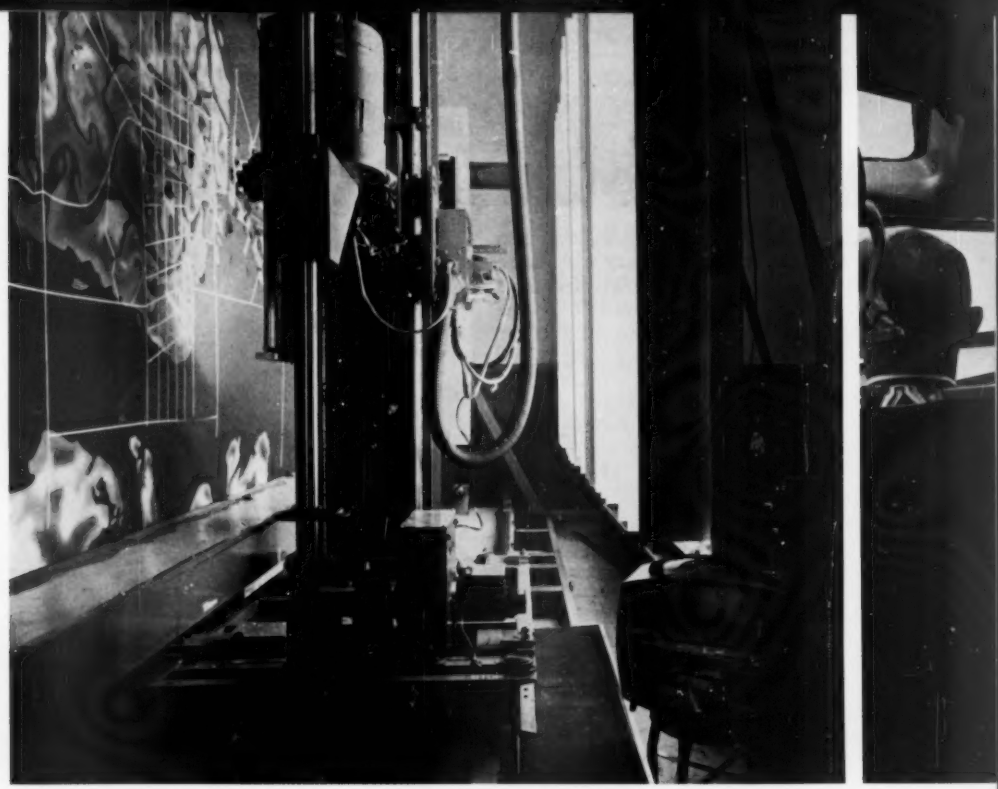
Each FAA procurement office maintains its own bidders' lists. To get on a list, firms submit a "Bidders Mailing List Application" to FAA (*see list below*). Application forms (Standard Form 129) are available without charge.

All proposed FAA procurement and resulting contract awards over $5,000 are announced daily in the *Commerce Business Daily* sold by subscription from the U. S. Department of Commerce, Field Services, Administrative Service Office, Room 1300, New Post Office Building, 433 W. Van Buren Street, Chicago, Ill. Reference copies are available at all General Services Administration service centers and at field offices of the Small Business Administration and the Department of Commerce.

Another publication helpful to contractors doing or hoping to do business with the FAA, or any government agency, is the *U. S. Government Purchasing and Specifications Directory* which is available for reference at all Small Business Administration field offices. It is sold for 60 cents by field offices of the Department of Commerce and by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. This directory lists products purchased by Government agencies and locations of purchasing offices. It details contracting procedures to be followed by contractors or subcontractors in dealing with the Federal Government and describes the Government's specification system and how to use and obtain copies of the specifications.

Procurement Offices—All addresses prefixed by: Federal Aviation Agency.

Washington, Procurement Information Office, 800 Independence Ave., S.W., Washington, D. C. 20553; **Central Region**, 4825 Troost Avenue, Kansas City, Mo. 64110, ATTN: I & M Division; **Alaskan Region,** P. O. Box 440, Anchorage, Alaska 99501, ATTN: I & M Division; **Eastern Region,** New York International Airport, Federal Building, Jamaica, N.Y. 11430, ATTN: I & M Division; **Pacific Region**, P. O. Box 4409, Honolulu, Hawaii 96812, ATTN: I & M Division; **Southwest Region,** P. O. Box 1689, Forth Worth, Texas 76101, ATTN: I & M Division; **Aeronautical Center,** Installation and Materiel Dept, P. O. Box 1082, Oklahoma City, Okla. 73101; **Southern Region,** 52 Fairlie St., N.W., Atlanta, Ga. 30320, ATTN: I & M Division; **Western Region,** 5651 Manchester Ave., P. O. Box 90007, Airport Station, Los Angeles, Calif. 90009, ATTN: I & M Division; Research and Development Service, National Aviation Facilities Experimental Center, Atlantic City, N.J. 08405, ATTN: Contracts Branch.



Training air carrier inspectors: Camera scans "terrain" on wall, projects it on monitor *(right)* and . . . . . also on sc

FAA's Comprehensive Training Progr

This is the first article in a three-part series on a unique establishment, the FAA's Aeronautical Center.

. . . The man wearing the headset glanced at the blip on the radarscope screen and handed off the airliner to the Center miles away.

. . . A second man at the controls of the big jet transport on final approach suddenly slapped the throttle handles, pulled up the landing gear and started the flaps toward up position —an aborted landing.

. . . Still another man manipulated the probes of a voltmeter delicately through the electronic complexity of a long-range radar. The meter showed a power drop, pointing out the trouble.

These men are all students at the FAA Academy engaged in the serious business of training—training that will soon be applied to the exacting task of expediting the safe and efficient flow of aerial traffic.

Students at the FAA Academy in Oklahoma City use the actual tools of their trade in one of hundreds of instructional courses. As many as 1,500 have been in training at one time, including students from more than 50 foreign countries in the Free World.

In terminal control training, for example, the student uses miniature, battery-operated models of aircraft on a floor laid out to simulate an actual airport. A mock-up of a control cab familiarizes him with procedures while other students act as pilots "flying" in the airport control zone. Two-way, pocket-size radios add communications realism.

In other areas, students used radar simulators for both approach and departure control under IFR conditions. Today's high-speed jet age calls for much control work in other than clear weather.

Within the laboratory section can be found more than 3,000,000 feet of closed-circuitry used to simulate actual conditions in the field. Control cabs or Air Route Traffic Control Center mockups are duplicates of the ones actually used in controlling actual traffic.

Courses in air traffic control training range from four days to seventeen weeks—the four-day period being an indoctrination, or short course, for those who need to know about the fundamentals of air traffic control but will not actually control traffic.

Pilots with the Federal Aviation Agency fall generally into several categories: Flight inspectors who fly with the commercial airline pilot; the general aviation operations inspector; test pilots who work with manufacturers; facilities flight check pilots who fly low, medium and high altitude checks of all

of shown) in front of cockpit of Boeing 720 simulator to give illusion of landing

n Covers the Airfront

ground navigational aids, checking their accuracy to keep aircraft flying safely; pilots who test and verify air traffic control procedures.

The men who inspect airlines operations receive both basic qualification training and proficiency training in specific aircraft operated by the Academy. Training for these air carrier inspectors averages 40 hours a year. Proficiency retraining is carried out on a quarterly basis. These pilots must be sufficiently proficient to check airline pilots whose operations they inspect.

Aircraft currently being used for this type of training are a Lockheed Electra, a Boeing 720 and a Convair 880. Since airlines still use older aircraft, proficiency training is given in DC-6s, Convair 340s, the old reliable of aviation—the DC-3, and numerous general aviation airplanes as well as helicopters.

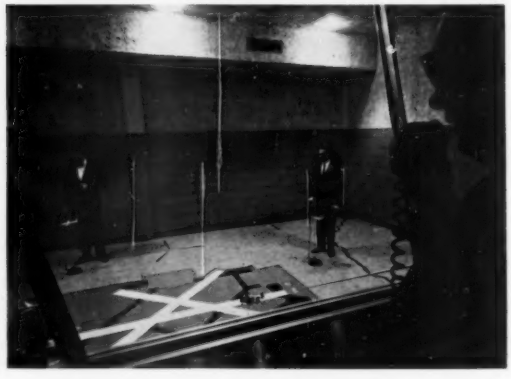
The burgeoning screen of electronic safety across the nation's airways requires experts with the ability to cope with equipment that changes constantly as aircraft travel higher and faster. For instance, nearly the entire country is now under positive radar control at 24,000 feet and above.

The training of these electronic technicians and engineers must start far beyond the simple basics. Each entering student is a man with considerable background in the field of electronics. He must be able to find trouble quickly in such complex

Top, classroom lecture for helicopter maintenance inspectors. Above, mathematics refresher course comes in handy. Below, Gordon Post *(right)*, brother of famed Wiley Post, is T-33 simulator instructor.

The exacting demands of installing and maintaining complex electronic and radio equipment require highly-skilled technicians. At the FAA Academy these men receive the best of training: *Above,* student and instructor interpret oscilloscope; *left,* fully-equipped classroom; *right,* working on navigation equipment.

Budding air traffic controllers learn the fine points of their craft under simulated conditions that closely duplicate the real thing. *Above,* IFR room for simulating arrival and departure control. *Below,* students take working role of pilots and tower controller.



instruments as micro-waves, bright display radars, or radar beacons and on down to instrument landing systems and omni-range facilities. The very latest in equipment is used by the student who will become the man who installs and maintains the navaids and communications in one of the FAA's eight regions including overseas areas.

The old and the new in jet and reciprocating engines and hydraulic, fuel and electrical systems are part of the studies for the man who will be an airline maintenance inspector, systems inspector or engineering and manufacturing inspector. These are the men who work with the airlines, general aviation and aircraft manufacturers in the certification, operation and airworthiness of aircraft and aircraft components.

This training process never stops.

As new and improved equipment and procedures are developed, constant training at the FAA Academy keeps these FAA specialists familiar with their fields in the ceaseless quest to achieve the highest standards of aviation safety.

Emperor Haile Selassie and Dean Rusk greet Ethiopian embassy officials.

Prime Minister Home and Prince Philip at Dulles.

DULLES INTERNATIONAL PLAYS HOST TO WORLD LEADERS

On November 17th, 1962, the late President John F. Kennedy dedicated Dulles International Airport as the Nation's gateway to the world. Twelve months later—on Sunday night, November 24th—Dulles International was the scene of a somber assembly of world leaders and foreign royalty all coming to Washington for the funeral of the slain President.

Within an eight-hour period—from four to midnight—nearly 30 heads of state or members of royal families touched down at Dulles. There was no ceremony or fanfare attendant upon their arrival. They were welcomed by Secretary of State Dean Rusk and by members of their own embassy staffs who came out to welcome them. For the most part, the foreign dignitaries chatted quietly with the Secretary and then moved out of the airport into waiting cars.

Included among the visiting dignitaries were Britain's Prince Philip and Prime Minister Home; French President Charles de Gaulle; a West German delegation headed by Chancellor Erhard; Belgium's King Baudouin; Ethiopian Emperor Haile Selassie, and others. In all, 30 nations were represented, and nearly as large a number of other foreign dignitaries were arriving at the same time at nearby Washington National Airport.

The arrival of the special and chartered jet flights caused no problems and all planes landed without incident. Nor was there any problem handling the crowds of people and the horde of newsmen and television technicians.

A number of FAA officials led by Administrator Halaby turned out to help with arrangements at both airports.

Above, Foreign Minister Attilio Piccioni of Italy; below, Prince Moulay Abdullah, Morocco, greet their respective embassy personnel.

ICING

This is the tenth article in a series on the subject of aviation weather prepared by meteorologists of the Weather Bureau.

On every winter flight, the pilot must consider the possibility of aircraft icing. He is probably familiar with the mechanical effects of structural icing—loss of lift, increased drag, loss of airspeed and maneuverability, and increased stall speed. But the cause-and-effect relationships between weather and icing are not so widely known.

Fortunately, nature provides visible warning of the danger of external or structural icing, giving the alert pilot an opportunity to take preventive action. *Structural ice can form only when the temperature is freezing or colder and moisture is visible. The two conditions must exist together.* The aircraft must be flying through visible moisture—clouds, rain, drizzle or wet snow—and, when the droplets strike, their temperature or the temperature of the plane's surface must be 32° F. or below.

Water droplets in the atmosphere can remain in a liquid state even when their temperature is far below freezing. However, these supercooled water droplets freeze instantly on contact with a moving plane.

The ice problem becomes more serious with greater amounts of liquid water and colder air temperatures. Therefore, clouds with the largest water droplets and the coldest air temperatures are likely to produce the heaviest icing.

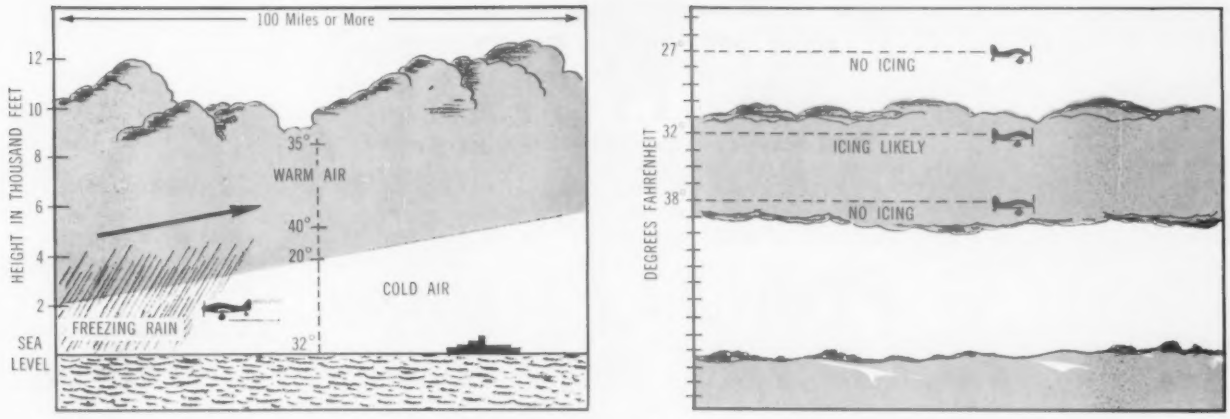
Large droplets naturally require large upward forces to keep them suspended in the air. Cumulus clouds, which are formed by strong updrafts, contain the largest droplets. Moreover, cumulus clouds extend to high altitudes where the combination of very cold temperatures and very large droplets produces the maximum amount of ice. In extreme cases, two to three inches of ice have formed on aircraft in as many minutes.

Stratiform clouds, with their shallow layers of small droplets, produce less ice in a given period of time but may create extensive areas of relatively continuous icing conditions.

Droplet size also affects the type of ice formed on aircraft. The large droplets in cumulus clouds freeze slowly, giving the water time to spread before it freezes into a smooth, tenacious layer over the airfoil. This is clear or *glaze ice*, like the ice that forms on trees and other objects when freezing rain falls to earth. Smaller droplets in stratiform clouds freeze almost instantly on impact, building up a rough, grainy, irregular layer called *rime ice*.

Glaze ice usually accumulates more slowly than rime, but covers a greater area of the airfoil surfaces. Because the glaze retains the same shape as the airfoil and may also be transparent, it is difficult to detect. Rime ice can be detected at once, because it is generally opaque and irregular.

Certain winter weather situations are especially conducive to aircraft icing. One is the wintertime warm front that moves northeastward from the Gulf States across the Atlantic seaboard. The high moisture content of such fronts produces extensive horizontal and vertical cloudiness. It often results in considerable precipitation. Icing danger lurks in the clouds at altitudes above the freezing level, which may be quite low, as well as in rain falling through the cold air in advance of the warm front. In addition to causing icing, this particular weather situation often produces low ceilings and visibilities over broad areas. Before takeoff, the pilot should evaluate conditions critically, allowing himself the widest possible safety margins and giving special attention to the selection of alternate airports.



Left, example of freezing rain under a warm front. Right, ice forms when temperature is below freezing and there is visible moisture.

Heavy icing is often produced when moist, cold air from the northern Pacific Ocean—sometimes referred to in forecasts as polar Pacific air—invades the Far Western States during winter months. These air masses are less stable than the Gulf types, and the mountain ranges near the coast provide the extra lifting that leads to the formation of heavy cumulus clouds. Within these clouds, the combination of abundant, large water droplets and very cold temperatures is ideal for glaze ice formation. Moreover, the rugged terrain makes it very dangerous for the pilot to let down into warmer air either to get rid of a load of ice or to prevent its accumulation.

Temperatures below freezing increase the hazards of an instrument approach through extensive stratus layers. The concentration of small droplets in stratus clouds can build up quite a load of ice during a long, slow approach—just when the pilot is busiest and has the least opportunity to observe ice formation. Operating air speeds and altitudes are very critical at this time, and an additional load of wing ice along with windshield ice can be most troublesome. The pilot can prepare for these developments before takeoff, by noting the vertical extent and temperatures of low stratus layers near destination airports.

Structural ice can also form while a plane is on the ground. Water deposits, left on an aircraft after it has been put in a hangar to melt ice or snow, can freeze when the plane is brought outside. Or, when an aircraft comes out of the hangar during a snowstorm, the falling snow may melt on the plane's warm surface and refreeze later to form ice.

Frost forms on upper surfaces of aircraft left outdoors on clear, calm nights when the air is damp and the plane's surface temperature falls below 32° F. *Before taking off, the frost should be removed.*

Propeller ice is often described as a greater hazard than wing ice, because it directly robs the engine of effective power. Also, when propeller ice dislodges unevenly, the resulting vibration can necessitate power reduction at a most inopportune time.

Many commercial preparations are available for retarding or preventing ice formation on wings and propellers. Usually, these must be applied on the ground before takeoff, which means that winter IFR preflight planning should always take into account the possibility of aircraft icing.

(The problem of internal or carburetor icing is entirely different from that of structural icing. Carburetor icing can occur when temperatures are well above freezing and when there is no visible moisture in the air. Because carburetor icing characteristics vary from one plane to another, the pilot's best defense is a thorough knowledge of his aircraft's engine and of the manufacturer's recommendations for carburetor ice prevention. He can then avoid the weather conditions that favor such icing for his aircraft.)

What can the pilot do to combat structural icing? Before his flight, he can plan to avoid levels or areas where icing is likely. During flight, he can get out of the level or area where icing occurs. If his aircraft has anti-icing systems or de-icers, proper operation of the equipment should take care of all but the worst icing situations.

There are a number of effective ways of dealing with structural icing conditions in flight. Ice can be dislodged by moving to a warmer layer of air or by using de-icer boots. Rime ice is easier to remove than glaze ice, and the technique for operation of de-icer boots depends on the ice type. Glaze ice is best removed by intermittent operation of the boot after a thin layer of ice has formed. Continuous operation of the boot dislodges rime ice formations.

If clouds are layered, flight below the freezing level is preferred when terrain permits. Flight at altitudes where temperatures are much below freezing (15° F. or colder) will avoid most of the ice. When ice is caused by freezing precipitation, there is warmer air above, and it may be possible to climb into the warmer layer.

Careful preflight planning, and consultation with the briefer or forecaster, can help the pilot avoid icing conditions or fly through them in the shortest time. Weather Bureau area forecasts and inflight advisories (SIGMET and ADVISORY TO LIGHT AIRCRAFT) point out areas and levels where moderate or heavy structural icing may be expected. The area forecast has a special segment for this purpose. Since pilot reports (PIREPS) of icing are the only means of verifying these forecasts, all pilots are urged to provide positive or negative reports. In this way, the pilot and the briefer work together on the icing problem of winter flight under Instrument Flight Rules.

SAFETY FIRST

Preflight Planning

A safe flight begins before the plane becomes airborne. It begins with a pilot's understanding of a succinct phrase that can be found in the *Federal Aviation Regulations*, Part 91 (General Operating and Flight Rules):

"Each pilot in command shall, before beginning a flight, familiarize himself with all available information concerning that flight."

The regulation further specifies that preflight action for cross-country trips shall include a careful study of available current weather reports and forecasts, consideration of fuel requirements, and provision for an alternate course of action if the flight cannot be completed as planned.

The importance of careful and thorough preflight planning is emphasized by these minimum requirements. A wise pilot will take advantage of all material and services available to him in order to complete his flight with confidence, ease and safety.

■ Before takeoff, the pilot should lay out his planned route using appropriate, current sectional charts. Check points should be selected along the route and noted in some way. These should be easy-to-locate points such as large towns, lakes, rivers or a combination of recognizable points.

The planned route also should be checked for restricted and prohibited areas, military climb corridors and Air Defense Identification Zones (ADIZ). In addition, the terrain along the route should be studied to permit selection of an appropriate altitude to avoid particularly rough terrain and obstructions.

Charts of areas adjoining the flight route also should be reviewed. This information will prepare the pilot to circumnavigate bad weather or locate his position should he stray off-course.

■ The pilot should make a list of the navigation aids to be used along his route and the receiving frequency of each. Aids with voice facilities should be noted to indicate stations broadcasting weather reports. Information on both receiving and transmitting frequencies will be found in the Air Navigation Radio Aids section of the *Airman's Guide* or the NOTAMS section if there has been a recent change.

The *Directory of Airports and Seaplane Bases*, a quarterly supplement of the *Airman's Guide*, also should be reviewed for information on the elevation, runway and lighting facilities and available services at the airport of destination. Additional data may be found in the NOTAMS and Air Navigation Radio Aids sections of the current *Airman's Guide*. Information in the *Airman's Guide* should be used in preference to the information on the back of the sectional charts since it is more current.

■ The *Airplane Flight Manual* should be checked for airplane weight-and-balance data. The weight of fuel, oil, passengers and baggage should not exceed the maximum allowable. The load also must be properly distributed so that the airplane's center of gravity is within the established limits.

Determine the takeoff and landing distance from the appropriate charts in the flight manual, based on the calculated load, elevation of the airport and temperature. Then compare these distances with the amount of runway available. *Remember that takeoff and landing distances vary proportionally with weight, elevation and temperature.*

Check fuel consumption charts in the manual to determine the rate of fuel consumption at the estimated flight altitudes and power settings. Then compare it with the estimated flight time to decide on refueling points along the planned route.

■ Before takeoff, the pilot should visit the nearest Weather Bureau station or FAA Flight Service Station. Telephone calls are welcome, but a personal visit is best since the pilot will have access to the latest weather maps and charts, area and terminal forecasts, advisories for light aircraft and other pertinent information.

After receiving his weather briefing, the pilot must determine if the flight can be made safely on the basis of the forecast and present conditions. Beware of marginal weather.

■ Finally, before departing, the pilot should file a flight plan with the nearest Flight Service Station either in person or by phone. Radio should be used only when it is impossible to file the flight plan in any other way.

A flight plan assures prompt search and rescue action in emergencies and also alerts FAA facilities to the flight and permits them to give better service. Flight plans should be closed promptly after completion of the flight in order to avoid needless search and rescue efforts.

On cross-country flights in aircraft with two-way radio, the pilot should request flight following service when filing his flight plan. The service provides preflight and in-flight assistance, including radio reports on the latest weather and airport conditions.

Even if no flight plan is filed, pilots should make regular position reports to Flight Service Stations to receive altimeter settings and weather information. This also will permit search and rescue efforts to be focused in the proper area in case of emergency, avoiding undue loss of time.

Letters

FAA

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. Please keep them brief. No anonymous letters will be used, but names will be withheld on request.

• Modified Instrument Rating

The thought has occurred to me that it would be a very sensible and feasible program to have additional licenses between the private license and instrument license so that a private pilot would be able to go through broken and overcast clouds under control of a local Flight Service Station. This would save an enormous amount of delay and would encourage many private pilots to take instrument training, although they might not want to go far enough to complete the full course.

J. L. C. McFaddin
Beaumont, Texas

The need for the establishment of a pilot rating which would entitle its holder to limited instrument flying privileges has been studied by the FAA for some time. It is the current consensus of the FAA and of many segments of the general aviation industry that any advantages which such a limited rating might introduce would be outweighed by safety disadvantages.

The best forecasters often find weather developments quite different from those they anticipated. Encouraging an individual to conduct a flight of which only portions were expected to require instrument flying might well be leading him into a trap from which he would not have the background to make a successful recovery. We have thus concluded that no halfway instrument proficiency is acceptable.

• Air Pollution

In the interest of aviation, it might be well for the FAA to encourage and promulgate a new form of Pilot Reports which would bring to your attention smoke hazards and their sources [as a means of combatting air pollution].

Alfred L. Wolf
Philadelphia

Although certain conditions such as thunderstorms, icing and turbulence are potentially more hazardous to aircraft in flight, a pilot weather report (PIREPS) is not limited to these areas alone and may relay any other significant flight condition information. It would be quite proper for a pilot to report that reduced visibility had been or was being encountered due to smoke and, in particular, if visibility had been decreased to below the minimum required for VFR operations.

While we would agree that elimination of air pollution is highly desirable, it is not within the statutory obligation of this Agency to impose on pilots a reporting requirement directed at smoke abatement programs.

Those responsible for local smoke abatement may find it possible to obtain the reporting assistance of pilots and aircraft based in the area on a cooperative or voluntary basis.

• Kudos

A short time ago I took a check ride with one of your FAA men, Mr. K. D. Warner, at Detroit Willow Run Airport for the purpose of obtaining my Blue Seal instrument rating.

I wish to state that I have never been treated with more courtesy and understanding than I was by this man. As long as we have men of his ability and knowledge of human nature, I think that we have nothing to fear about the future of our aviation program.

George A. Gulick
Lakeland, Mich.

• VFR on Top

Is the condition "VFR on top" a condition of Visual Flight Rules or Instrument Flight Rules? It appears that the rules state that if an airplane can take off under Visual Flight Rules it may then go over a cloud bank of any duration and be VFR on top even though the pilot cannot see the ground, as long as the pilot can then land the airplane at the destination under Visual Flight Rule conditions.

From a logical point of view, it appears that if this interpretation is correct two variables are present that are not under the control of the pilot. One of these is that if the plane has trouble the pilot might have to come down through the clouds under instrument conditions and not have time to file an instrument flight plan. The other condition is, of course, that should the conditions change on arrival at the destination it might be necessary to file an instrument flight plan to come down through the clouds assuming, of course, that the pilot is so qualified and the airplane properly equipped. If VFR on top is an instrument condition it would appear that it would be illegal for a pilot to be flying VFR on top without an appropriate flight plan and then when he finds his conditions to be below VFR minimums at destination, to file a flight plan.

Cecil A. White, Jr.
Dallas

The condition "VFR on top" is governed by Visual Flight Rules (VFR).

It is the responsibility of the pilot in command of an aircraft, while operating under VFR, to maintain prescribed minimum distances from clouds at all times during flight.

Specific information as to both vertical and horizontal distance requirements may be found in Section 91.105 of the Federal Aviation Regulations.

If a flight is to be made "VFR on top", both the climb to "on top" and the descent must be made in compliance with the above regulations.

Section 60.2 of the regulations, "Authority of the Pilot", contains information on emergency situations and establishes pilot responsibility for reporting emergency action.

• Buzzing Incident

Recently a low flying plane buzzed me while I was playing golf. I have no thought of reporting the pilot or causing any trouble, but my curiosity prompts me to ask what the rule or regulation is regarding the minimum height of a plane over private, populated areas.

Rev. Fred W. Gibson
Aurora, Ill.

Minimum altitudes for aircraft operation are specified in Part 91 of the Federal Aviation Regulations. Roughly stated, these minimums are 1,000 feet above obstacles when flying over cities and towns and 500 feet over uncongested areas. When over open water or sparsely populated areas, aircraft must stay at least 500 feet from people or property on the surface. The seriousness of buzzing incidents is illustrated by the 1961 accident record: 73 fatalities, 62 serious injuries, 96 aircraft destroyed. These all resulted from buzzing and low acrobatics.

Buzzing incidents should be reported to the nearest FAA facility. Witnesses should make an effort to obtain the registration number of aircraft doing the buzzing in order to facilitate an investigation.

• Helicopter Rating

In *Time Magazine* of April 7, 1961, the following is quoted:

"The Federal Aviation Agency classes all homemade helicopters as 'experimental aircraft'—even if they are constructed from commercial kits—so backyard chopper buffs need no helicopter pilot's license."

Is this still in effect?

Larry W. McVey
Tacoma, Wash.

This article describes regulations pertaining to the operation of gyrogliders confined to flight at the end of a tow line from the surface.

Federal Aviation Regulations *require that the operator of an aircraft in free flight possess a current pilot certificate issued by the FAA Administrator. This requirement is applicable to homemade helicopters as well as to aircraft constructed by commercial manufacturers. Flight Standards Service Release No. 456 contains information pertaining to the certification and operation of amateur-built aircraft.*

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